

REVISION OF THE CRINOID GENUS HIMEROMETRA.

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HISTORY OF THE GENUS.

The first known species of the genus *Himerometra* was described by P. H. Carpenter in 1881 under the name of *Actinometra robustipinna*. Looking backward at Carpenter's work from our present vantage point which we have reached through the gradual accumulation of facts extending over a period of more than 30 years, it seems to us somewhat extraordinary that Carpenter should have referred this form to the genus *Actinometra* instead of to the genus *Antedon* as, using the systematic scheme of the day, he ought to have done; but it was a very natural thing to do—in fact it is difficult to see how he could have done otherwise, for the single specimen known to him is without a disk and without cirri, and is so badly broken that only a single one of the enlarged proximal pinnules is reasonably complete. He knew of no “tridistichate” *Antedon* in which the size of the lower pinnules decreases from the “distichal pinnule” outward, though this is the usual condition in the “tridistichate” species of *Actinometra*; therefore, as the disk and tips of the lower pinnules, upon which he chiefly relied in separating *Antedon* from *Actinometra*, were absent, he very logically placed the species in the latter genus.

But the reference of *robustipinna* to *Actinometra* instead of to *Antedon*, however natural it may have been, was most unfortunate, for all subsequent students have accepted Carpenter's generic determination, so that the species has remained entirely outside of the literature on the group to which it belongs, and instead has assumed a position in another group with which it has nothing whatever to do.

In 1890 Hartlaub described as new three additional species of this genus, redescribing them in greater detail and figuring them in 1891. Two of these new species (*Antedon martensi* and *Antedon kraepelini*) he placed side by side in a new section of the “Savignyi group” of Carpenter's classification characterized by the presence of palmar

(i. e., IIIBr) series of two ossicles each of which the axillary is "without a syzygy," by the absence of lateral processes on the lower pinnules, and by the possession of very stout distichal pinnules (P_D); the two species he separated according to the presence (*martensi*) or absence (*kraepelini*) of a strong eversion of the distal borders of the proximal brachials and the more abrupt (*martensi*) or more gradual (*kraepelini*) taper of the proximal pinnules; he remarked that the outer palmar (IIIBr) series of *Antedon kraepelini* are often "three jointed, with a syzygy in the axillary" (i. e., $4[3+4]$). The third species he placed in a new section of the "Savignyi group" including species in which the inner palmar series are two jointed (i. e., 2) and the outer are three jointed with a syzygy in the axillary (i. e., $4[3+4]$); with this new species, which he called *Antedon crassipinna*, he placed, under the name of *Antedon bipartipinna*, *Craspedometra acuticirra*.

Hartlaub recognized the close relationship between his *Antedon martensi* and his *Antedon kraepelini*, but though he noticed that the outer palmars of the latter are often $4(3+4)$ while the inner are 2, the very character upon which he placed most reliance in differentiating *Antedon crassipinna*, he failed to detect the similarity of the two.

Antedon martensi, described from a small and imperfect specimen from Singapore, is a valid species; *Antedon kraepelini*, described from a badly broken specimen from Akyab, Burma, is, so far as I can see after a minute examination of both type specimens, the same as the *Actinometra robustipinna* of Carpenter, which Hartlaub had no reason to suspect was in the slightest degree related to it; *Antedon crassipinna* was described from specimens from Amboina, but he includes under this name a specimen from Cochin China, which he studied in the Hamburg Museum; the specimens from Amboina represent the same species as Carpenter's *Actinometra robustipinna*, also from the Moluccas, while the specimen from Cochin China, represents a form recently described under the name of *Himerometra magnipinna*, with the type of which I was able to compare it directly.

In 1894 Bell described, in the "Granulifera group" of Carpenter, a new species from the Macclesfield Bank, which he called *Antedon inopinata*. Had he referred it to the "Savignyi group," where it belongs, he would have noticed its identity with one or other of the three species described by Hartlaub. It represents the same form as Hartlaub's *Antedon kraepelini*, and the specimens from Amboina referred to *Antedon crassipinna*, and also it is the same species as the *Actinometra robustipinna* described by Carpenter.

In 1895 Professor K  hler recorded *Antedon crassipinna* from the Sunda Islands; while I have not seen his specimens, I have not the slightest doubt that he is right in his identification. His record I

interpret as referring to Hartlaub's *Antedon crassipinna* from Amboina, which is the same as *Antedon inopinata*, *Antedon kraepelini*, and *Actinometra robustipinna*.

In 1902 Bell, under the very comprehensive name of *Antedon palmata*, recorded a comatulid from the Maldive Islands which, proving to be a species of *Himerometra*, has been named *Himerometra sol*.

In January, 1908, the present author described an interesting new species of this genus under the name of *Himerometra persica* from the Persian Gulf, in July of the same year noted the fact that he had seen specimens of *Himerometra crassipinna* (i. e., *martensi*, his conception of *crassipinna* up to this time being entirely based upon specimens from Singapore) erroneously labeled "Japan," and in August published a note in which he stated that, while absolutely unrecognizable from the description, Bell's *Antedon inopinata* evidently belonged to the "Savignyi group" of Carpenter and not to the "Granulifera group" in which it had been described; at the same time he called attention to the redescription of Carpenter's *Actinometra robustipinna* by K  hler; not having at the time seen the type of *Actinometra robustipinna*, it was only natural to assume, as K  hler had done, that the *Actinometra* from Amboina with enormously large lower pinnules was really the species described by Carpenter, though now we know that it is really *Comanthus bennetti*, while Carpenter's species is a *Himerometra*.

In December, 1908, there was published by the present author a preliminary notice of a large collection of comatulids made by the United States fisheries steamer *Albatross* among the Philippine Islands, in which there were described as new *Himerometra bartschi*, *H. robustipinna*, and *H. magnipinna*, while *H. persica*, recently described from the Persian Gulf, was recorded from the Philippines. *Himerometra bartschi* and *H. magnipinna* are valid species, and the latter is the form to which the specimen from Cochin China, recorded by Hartlaub under the name of *crassipinna*, must be referred, though the fact was not recognized at the time; *H. persica* is in reality the closely related *H. bartschi*, while the species described as *H. robustipinna* is, by a curious coincidence, the same as the *Actinometra robustipinna* of Carpenter.

In 1909 the present author recorded and described at some length numerous specimens of a species of *Himerometra* from Singapore; these he referred to *H. crassipinna*, believing them to represent the *Antedon crassipinna* of Hartlaub. Subsequent investigation has shown that in reality they represent the *Antedon martensi* of Hartlaub, and should have been recorded under the name of *Himerometra martensi*. At the same time he redescribed *Antedon martensi* (under the name of *Heterometra martensi*), basing the redescription upon a small and immature specimen from Singapore which appeared to meet the

requirements of the original description. A recent reexamination of this individual has shown that it is undoubtedly referable to *Himerometra bartschi*, the long and rather slender cirri, the very long and comparatively slender proximal pinnules which become very delicate and flagellate distally, and the incipient carination of the lower pinnules being sufficiently diagnostic.

In 1911 *Himerometra magnipinna* was recorded from Palawan, in the Philippine Islands, and, in a paper on the recent crinoids preserved in the Leyden Museum, a redescription of the type specimen of Carpenter's *Actinometra robustipinna* which the author had recently examined in Leyden was published.

In a paper on the crinoids of the Hamburg Museum which appeared in 1912 the type specimen of *Antedon kraepelini* was redescribed, and Hartlaub's specimen from Cochin China, which he had referred to his *Antedon crassipinna*, was redetermined as identical with *Himerometra magnipinna*, the redetermination having been based upon a direct comparison with the type of the latter. *Himerometra magnipinna* was also recorded from Isabela, on the island of Basilan, Philippines; Ekalin, on St. Mathias Island; and from Pitilu, in the Admiralty Islands. In a paper on the crinoids of the Berlin Museum published a few days later, the identity of the specimen described by Hartlaub as *Antedon martensi* with the specimens recorded from Singapore under the name of *Himerometra crassipinna* was announced, and both were referred to *H. crassipinna* as the true identification of the types of that form had not at that time been determined. *Himerometra crassipinna* (i. e., *H. martensi*) was also recorded from British North Borneo (the comparison being made with specimens from Singapore), and *H. magnipinna* was recorded from St. Mathias Island.

In the present author's monograph of the crinoids of the Indian Ocean the first comprehensive survey of the genus *Himerometra* was published. In this the following species are admitted as valid:

Himerometra bartschi, Philippine Islands.

Himerometra magnipinna, Philippine Islands; St. Mathias Island.

Himerometra pulcher, new name (*Himerometra robustipinna* A. H. Clark, 1908, not *Actinometra robustipinna* P. H. Carpenter, 1881), Philippine Islands.

Himerometra inopinata, Macclesfield Bank.

Himerometra sol, Maldive Islands.

Himerometra crassipinna, Amboina; Singapore; Pulau Ubin, Singapore; ?Cochin China.

Himerometra kraepelini, Akyab, Burma.

Himerometra persica, Persian Gulf; Philippine Islands.

Himerometra sp. (*Actinometra robustipinna*), Moluccas.

Antedon martensi as in 1909 was referred to the genus *Heterometra* instead of to the genus *Himerometra*.

LIST OF THE REFERENCES TO SPECIES OF THE GENUS HIMEROMETRA,
WITH THE CORRECT DETERMINATION OF EACH.

- Actinometra robustipinna* P. H. CARPENTER, Notes from the Leyden Museum, vol. 3, 1881, p. 201.—A. H. CLARK, Notes from the Leyden Museum, vol. 33, 1911, p. 182; Crinoids of the Indian Ocean, 1912, pp. 116, 117*robustipinna* (2)
- Antedon crassipinna* HARTLAUB, Nachr. Ges. Göttingen, Mai 1890, p. 185: Nova Acta Acad. German., vol. 58, 1891, No. 1, p. 32, pl. 1, figs. 1, 5, 10.*robustipinna* (2)+
magnipinna (3)
- Antedon crassispina* KÖHLER, Mem. soc. zool. France, vol. 8, 1895, p. 480.
robustipinna (2)
- Antedon inopinata* BELL, Proc. Zool. Soc. London, 1894, p. 398.—A. H. CLARK, Proc. U. S. Nat. Mus., vol. 34, 1908, p. 477*robustipinna* (2)
- Antedon kraepelini* HARTLAUB, Nachr. Ges. Göttingen, Mai 1890, p. 183; Nova Acta Acad. German., vol. 58, 1891, No. 1, p. 22, pl. 2, figs. 15, (21).—A. H. CLARK, Smiths. Misc. Coll., vol. 60, 1912, No. 10, p. 18*robustipinna* (2)
- Antedon martensi* HARTLAUB, Nachr. Ges. Göttingen, Mai 1890, p. 182; Nova Acta Acad. German., vol. 58, 1891, No. 1, p. 21, pl. 1, figs. 3, 6.—A. H. CLARK, Proc. U. S. Nat. Mus., vol. 43, 1912, p. 394*martensi* (1)
- Antedon palmata* (part) BELL, in Gardiner, Fauna and Geography of the Maldive and Laccadive Archipelagoes, vol. 1, 1902, pt. 3, p. 224*sol* (4)
- Heterometra martensi* A. H. CLARK, Vidensk. Medd. fra den naturhist. Forening i København, 1909, p. 164; Crinoids of the Indian Ocean, 1912, p. 127.
bartschi (5)
- Himerometra bartschi* A. H. CLARK, Smiths. Misc. Coll. (Quart. Issue), vol. 52, 1908, p. 212; Proc. Biol. Soc. Washington, vol. 22, 1909, p. 7; Crinoids of the Indian Ocean, 1912, p. 114*bartschi* (5)
- Himerometra crassipinna* A. H. CLARK, Smiths. Misc. Coll. (Quart. Issue), vol. 50, 1907, p. 356*robustipinna* (2)+
magnipinna (3)
- A. H. CLARK, Proc. U. S. Nat. Mus., vol. 34, 1908, p. 319; Smiths. Misc. Coll. (Quart. Issue), vol. 52, 1908, p. 213; Vidensk. Medd. fra den naturhist. Forening i København, 1909, p. 155; Proc. U. S. Nat. Mus., vol. 43, 1912, p. 394
martensi (1)
- A. H. CLARK, Proc. Biol. Soc. Washington, vol. 22, 1909, p. 7; Crinoids of the Indian Ocean, 1912, p. 116*martensi* (1)
robustipinna (2)
magnipinna (3)
- Himerometra inopinata* A. H. CLARK, Crinoids of the Indian Ocean, 1912, p. 114
robustipinna (2)
- Himerometra kraepelini* A. H. CLARK, Smiths. Misc. Coll. (Quart. Issue), vol. 50, 1907, p. 356; Proc. Biol. Soc. Washington, vol. 22, 1909, p. 7; Crinoids of the Indian Ocean, 1912, p. 116*robustipinna* (2)
- Himerometra magnipinna* A. H. CLARK, Smiths. Misc. Coll. (Quart. Issue), vol. 52, 1908, p. 214; Proc. Biol. Soc. Washington, vol. 22, 1909, p. 7; Proc. U. S. Nat. Mus., vol. 39, 1911, p. 540; Smiths. Misc. Coll., vol. 60, 1912, No. 10, p. 17; Proc. U. S. Nat. Mus., vol. 43, 1912, p. 394; Crinoids of the Indian Ocean, 1912, p. 114*magnipinna* (3)
- Himerometra martensi* A. H. CLARK, Smiths. Misc. Coll. (Quart. Issue), vol. 50, 1907, p. 356; Proc. Biol. Soc. Washington, vol. 22, 1909, p. 7*martensi* (1)
- Himerometra persica* A. H. CLARK, Smiths. Misc. Coll. (Quart. Issue), vol. 50, 1907, p. 356; Bull. Mus. Comp. Zool., vol. 51, 1908, No. 8, p. 243; American Naturalist, vol. 43, 1909, p. 256*persica* (6)

- A. H. CLARK, Smiths. Misc. Coll. (Quart. Issue), vol. 52, 1908, p. 214. .*bartschi* (5)
A. H. CLARK, Proc. Biol. Soc. Washington, vol. 22, 1909, p. 7; Crinoids of the
Indian Ocean, 1912, p. 116. *bartschi* (5)
..... *persica* (6)
Himerometra pulcher A. H. CLARK, Crinoids of the Indian Ocean, 1912, p. 114
..... *robustipinna* (2)
Himerometra robustipinna A. H. CLARK, Smiths. Misc. Coll. (Quart. Issue), vol. 52,
1908, p. 213; Proc. Biol. Soc. Washington, vol. 22, 1909, p. 7. *robustipinna* (2)
Himerometra sol A. H. CLARK, Crinoids of the Indian Ocean, 1912, p. 115. *sol* (4)
Himerometra sp. A. H. CLARK, Notes from the Leyden Museum, vol. 33, 1911, p. 182;
Crinoids of the Indian Ocean, 1912, p. 117. *robustipinna* (2)
A. H. CLARK, Smiths. Misc. Coll., vol. 60, 1912, No. 10, p. 18. *robustipinna* (2)

THE PHYLOGENETIC INTERRELATIONSHIPS OF THE SPECIES OF THE
GENUS *HIMEROMETRA*.

Though the structure of the cirri and of the arms is in all remarkably uniform, on the basis of the structure of the proximal pinnules the six species of the genus *Himerometra* fall into three groups of two each, and these three groups appear to represent three distinct steps in phylogenetical advancement.

In the allied genera *Craspedometra* and *Heterometra* the enlarged proximal pinnules are, though greatly elongated, comparatively slender, and become very delicate and flagellate distally; they are more or less carinate proximally, and the component segments meet end to end without any overlapping; the first pinnule (including the pinnules on the division series if any be present) is shorter than the second, and the second is shorter than the third.

In *Himerometra persica* and *H. bartschi* the proximal pinnules, excepting in their relative proportions, are not very different from the type characteristic of *Craspedometra* and of *Heterometra*—they are comparatively slender, becoming very delicate and flagellate distally, are composed of smooth segments which meet evenly end to end, and have retained to some extent the proximal carination. *Himerometra bartschi*, with its more numerous arms and cirrus segments and the shorter and much less strongly carinate basal segments of its proximal pinnules, is more highly differentiated from the primitive type than is *H. persica*.

In *Himerometra sol* and *H. magnipinna* the proximal pinnules are exceedingly stout and have lost all trace of the carination of their basal segments, while the middle and outer segments have developed everted and prominent distal ends; they still retain, however, the flagellate tip. In *H. sol* the proximal pinnules appear to include a greater number of segments than do those of *H. magnipinna*, while the eversion of the distal edges of the segments is much more strongly marked, and is smooth and not spinous or serrate. *H. sol* therefore may be considered a less specialized type than *H. magnipinna*.

In *Himerometra martensi* and *H. robustipinna* the proximal pinnules are essentially as in *H. sol* and *H. magnipinna*; but the specialization has been carried a step further by the suppression of the flagellate tip, so that the pinnules are reduced to stout curved horn-like structures. *H. martensi*, in which the distal edges of the pinnule segments are prominently spinous, appears to be a step in advance over *H. robustipinna*.

Of these three specific groups the most primitive (including *H. persica* and *H. bartschi*) has the greatest range, from the Persian Gulf to the Philippines, the more specialized of the two species inhabiting the East Indies and the more generalized the Persian Gulf; the next most primitive (including *H. sol* and *H. magnipinna*) has the next greatest range, from the Maldivé Islands to the Philippines and the Admiralty Islands, and again the more specialized of the two species inhabits the East Indian region and the more generalized the western limit of the range of the group, the Maldivé Islands; the most specialized (including *H. martensi* and *H. robustipinna*) has the most restricted range, occurring only as far to the westward as the Mergui Archipelago, the more specialized of the two species being known only from the Straits Settlements and North Borneo, while the more generalized ranges from the Mergui Archipelago to the Moluccas and the Philippines.

KEY TO THE SPECIES OF THE GENUS HIMEROMETRA.

- a*¹. Enlarged proximal pinnules slender, flagellate distally, and very long (slightly more than one half as long as the cirri), composed of from 36 to 40 perfectly smooth segments most or all of which are longer than broad; a few of the earlier segments are narrowly, but prominently, carinate; the earlier segments of the following pinnules are very strongly carinate; the segments in the outer half of the cirri have prominent dorsal spines.
 - b*¹. 20–25 arms; about 35 cirrus segments; all of the segments in the proximal pinnules longer than broad (Persian Gulf)..... *persica* (6)
 - b*². 35–55 arms; about 40 cirrus segments; a few of the basal segments in the proximal pinnules are broader than long (Philippine Islands)..... *bartschi* (5)
- a*². Enlarged proximal pinnules very stout, with all or nearly all of the component segments broader than long, or at least as broad as long; none of the segments are carinate; following pinnules without carinate processes on the earlier segment
 - b*¹. Enlarged proximal pinnules with about 30 segments, very stout basally and distally gradually tapering to a delicate and flagellate tip; the distal edges of the segments in the middle half or proximal two-thirds are swollen and may be strongly everted, but are always smooth, never spinous.
 - c*¹. Cirri very stout, stouter than in any other species of the genus; the enlarged proximal pinnules have the segments in the basal two-thirds with strongly produced and everted distal edges (Maldivé Islands)..... *sol* (4)
 - c*². Cirri rather short and weak without, or with only slight traces of, dorsal processes on the outer segments; the enlarged proximal pinnules have the segments in the middle half with slightly swollen distal edges (Cochin China, Philippine and Admiralty Islands, and St. Mathias Island). *magnipinna* (3)
 - b*². Enlarged proximal pinnules with 20 or fewer segments, distally tapering more or less abruptly and without a flagellate tip.

- c¹. Segments of the enlarged proximal pinnules entirely smooth; the distal edges of the component segments may be slightly swollen, or they may be unmodified, but they are never spinous; distal edges of the proximal brachials smooth, or only very slightly produced (Arrakan coast, Burma, Amboina, the Sunda and Philippine Islands and Macclesfield Bank)... *robustipinna* (2)
- c². Segments of the enlarged proximal pinnules with prominently everted and spinous distal ends; distal edges of the proximal brachials strongly produced and everted (Singapore and North Borneo)..... *martensi* (1)

THE SPECIES OF THE GENUS HIMEROMETRA.

1. HIMEROMETRA MARTENSI (Hartlaub).

Antedon martensi HARTLAUB, Nachr. Ges. Göttingen, Mai 1890, p. 182 (Singapore); Nova Acta Acad. German., vol. 58, 1891, No. 1, p. 21, pl. 1, figs. 3, 6 (Singapore; more fully described and figured).—A. H. CLARK, Proc. U. S. Nat. Mus., vol. 43, 1912, p. 394 (examination of the type-specimen shows that *Antedon martensi* is the same as the *Himerometra crassipinna* from Singapore).

Himerometra martensi A. H. CLARK, Smiths. Misc. Coll. (Quart. Issue), vol. 50, 1907, p. 356 (listed); Proc. Biol. Soc. Washington, vol. 22, 1909, p. 7 (listed).

Himerometra crassipinna A. H. CLARK, Proc. U. S. Nat. Mus., vol. 34, 1908, p. 319 (specimen erroneously labeled "Japan"); Smiths. Misc. Coll. (Quart. Issue), vol. 52, 1908, p. 213 (compared with *H. bartschi*, new species, and with *H. robustipinna*, new species); p. 214 (compared with *H. magnipinna*, new species); Proc. Biol. Soc. Washington, vol. 22, 1909, p. 7 (listed); Vidensk. Medd. fra den naturhist. Forening i København, 1909, p. 155 (Singapore); Proc. U. S. Nat. Mus., vol. 43, 1912, p. 394 (British North Borneo; Singapore, the type of *Antedon crassipinna* agrees in every particular with specimens of *Himerometra crassipinna* from Singapore); Crinoids of the Indian Ocean, 1912, p. 116 (Singapore and Pulau Ubin, Singapore; the record from Amboina refers to *H. robustipinna*, and that from Cochin China to *H. magnipinna*).

Range.—Known from Singapore, Pulau Ubin, off the northeastern corner of Singapore Island, and from British North Borneo.

Depth.—Littoral.

2. HIMEROMETRA ROBUSTIPINNA (P. H. Carpenter).

Actinometra robustipinna P. H. CARPENTER, Notes from the Leyden Museum, vol. 3, 1881, p. 201 (Moluccas).—A. H. CLARK, Notes from the Leyden Museum, vol. 33, 1911, p. 182 (shown not to be an *Actinometra* at all, but to belong to the "Savigni group" of *Antedon*, falling in the genus *Himerometra*; doubtfully referred to *H. crassipinna* from Singapore, *i. e.*, *H. martensi*); Crinoids of the Indian Ocean, 1912, pp. 116, 117 (doubtfully referred to *H. crassipinna* from Singapore, *i. e.*, *H. martensi*).

Antedon kraepelini HARTLAUB, Nachr. Ges. Göttingen, Mai 1890, p. 183 (Akyab, Burma); Nova Acta Acad. German., vol. 58, 1891, No. 1, p. 22, pl. 2, figs. 15, (21) (Akyab, Burma; more fully described and figured).—A. H. CLARK, Smiths. Misc. Coll., vol. 60, 1912, No. 10, p. 18 (type-specimen appears to be a small individual of *H. robustipinna*).

Antedon crassipinna HARTLAUB, Nachr. Ges. Göttingen, Mai 1890, p. 185 (Amboina; but not specimen from Cochin China, which represents *H. magnipinna*); Nova Acta Acad. German., vol. 58, 1891, No. 1, p. 32, pl. 1, figs. 1, 5, 10 (Amboina; but not specimen from Cochin China, which represents *H. magnipinna*; more fully described and figured).

Antedon inopinata BELL, Proc. Zool. Soc. London, 1894, p. 398 (Macclesfield Bank, 31–36 fathoms).—A. H. CLARK, Proc. U. S. Nat. Mus., vol. 34, 1908, p. 477 (not recognizable from the description; originally described as a member of the “Granulifera group” of *Antedon*, but belongs in the “Savigni group”).
Antedon crassispina KÖHLER, Mem. soc. zool. France, vol. 8, 1895, p. 420 (Sunda Islands).

Himerometra crassipinna (part) A. H. CLARK, Smiths. Misc. Coll. (Quart. Issue), vol. 50, 1907, p. 356 (listed); Proc. Biol. Soc. Washington, vol. 22, 1909, p. 7 (listed); Crinoids of the Indian Ocean, 1912, p. 116 (records from Amboina; not records from Singapore and from Pulau Ubin, Singapore, which refer to *H. martensi*, or records from Cochin China, which refer to *H. magnipinna*; Hartlaub's specimen from Cochin China appears to represent a different species from that represented by examples from Singapore).

Himerometra kraepelini A. H. CLARK, Smiths. Misc. Coll. (Quart. Issue), vol. 50, 1907, p. 356 (listed); Proc. Biol. Soc. Washington, vol. 22, 1909, p. 7 (listed); Crinoids of the Indian Ocean, 1912, p. 116 (listed; synonymy; locality).

Himerometra robustipinna (new species) A. H. CLARK, Smiths. Misc. Coll. (Quart. Issue), vol. 52, 1908, p. 213 (*Albatross* Station 5165; Philippine Islands, south of San Gasanga, Tataan group; 9 fathoms); p. 214 (compared with *H. magnipinna*, new species); Proc. Biol. Soc. Washington, vol. 22, 1909, p. 7 (listed).

Himerometra sp. A. H. CLARK, Notes from the Leyden Museum, vol. 33, 1911, p. 182 (Moluccas; examination of the type of Carpenter's *Actinometra robustipinna* shows it to be a *Himerometra*, questionably referable to *H. crassipinna* from Singapore, i. e., *H. martensi*); Crinoids of the Indian Ocean, 1912, p. 117 (type of Carpenter's *Actinometra robustipinna* a typical *Himerometra*, possibly *H. crassipinna*).

Himerometra sp. A. H. CLARK, Smiths. Misc. Coll., vol. 60, 1912, No. 10, p. 18 (examination of the type of Hartlaub's *Antedon kraepelini* shows that it is a true *Himerometra*; it appears to be a small specimen of *H. robustipinna* A. H. Clark).

Himerometra pulcher A. H. CLARK, Crinoids of the Indian Ocean, 1912, p. 114 (new name for *Himerometra robustipinna* A. H. Clark, 1908, not *Actinometra robustipinna* P. H. Carpenter, 1881; synonymy, range, and depth).

Himerometra inopinata A. H. CLARK, Crinoids of the Indian Ocean, 1912, p. 114 (type-specimen of *Antedon inopinata* Bell, 1894, redescribed and shown to be a *Himerometra*; correction of original depth record, 31–36 fathoms, to read 13–36 fathoms, the depth given on the label attached to the specimen).

Range.—Known from Akyab on the Arrakan Coast, Burma, the Sunda Islands, the Moluccas, Amboina, south of San Gasanga (Sanga Sanga) (Tataan group), Philippine Islands, and from Macclesfield Bank.

Depth.—Littoral, and down to 13 (36) fathoms.

3. *HIMEROMETRA MAGNIPINNA* A. H. Clark.

Antedon crassipinna (part) HARTLAUB, Nachr. Ges. Göttingen, Mai, 1890, p. 185 (specimen from Cochin China); Nova Acta Acad. German., vol. 58, 1891, No. 1, p. 32 (but not figs. 1, 5, 10, on pl. 1) (specimen from Cochin China; the specimens from Amboina, upon which the description and the figures are based, represent *H. robustipinna*).

Himerometra crassipinna (part) A. H. CLARK, Smiths. Misc. Coll. (Quart. Issue), vol. 50, 1907, p. 356 (listed); Proc. Biol. Soc. Washington, vol. 22, 1909, p. 7 (listed); Crinoids of the Indian Ocean, 1912, p. 116 (record from Cochin China).

Himerometra magnipinna A. H. CLARK, Smiths. Misc. Coll. (Quart. Issue), vol. 52, 1908, p. 214 (Albatross Station 5139, Philippine Islands, between Jolo and Pangasinan Islands, 20 fathoms [type locality]; and Station 5147, off Balinpongpong Island, south of Jolo, 21 fathoms); Proc. Biol. Soc. Washington, vol. 22, 1909, p. 7 (listed); Proc. U. S. Nat. Mus., vol. 39, 1911, p. 540 (Ulugan Bay, Palawan); Smiths. Misc. Coll., vol. 60, 1912, No. 10, p. 17 (redescription and identification of Hartlaub's specimen from Cochin China; additional records, Isabela, Basilan, province of Mindanao, Philippine Islands; Ekalin, St. Mathias Island; Pitilu, Admiralty Islands); Proc. U. S. Nat. Mus., vol. 43, 1912, p. 394 (St. Mathias Island); Crinoids of the Indian Ocean, 1912, p. 114 (synonymy, range, and depth).

Range.—Known from Cochin China, the following localities in the Philippine Islands, Ulugan Bay, on the northwestern coast of Palawan, Isabela, on Basilan, south of the western end of Mindanao, between Jolo and Pangasinan Islands, and off Balinpongpong Island, south of Jolo, Pitilu, Admiralty Islands, St. Mathias Island (east of the Admiralty Islands), and from Ekalin on St. Mathias Island.

Depth.—Littoral, and down to 21 fathoms.

4. *HIMEROMETRA SOL* A. H. Clark.

Antedon palmata BELL, in Gardiner, Fauna and Geography of the Maldive and Laccadive Archipelagoes, vol. 1, 1902, pt. 3, p. 224 (Kolumaduli, Maldives; 38 fathoms).

Himerometra sol A. H. CLARK, Crinoids of the Indian Ocean, 1912, p. 115 (description based upon Bell's specimen of *Antedon palmata* recorded at the reference cited; compared with *H. magnipinna*).

Range.—Only known from Kolumaduli in the Maldive Islands, southwest of Ceylon.

Depth.—38 fathoms.

5. *HIMEROMETRA BARTSCHI* A. H. Clark.

Himerometra bartschi A. H. CLARK, Smiths. Misc. Coll. (Quart. Issue), vol. 52, 1908, p. 212 (Albatross Station 5146, west of Tapul Island, south of Jolo, 24 fathoms [type locality]; also found at station 5147, off Balinpongpong Island, south of Jolo, 21 fathoms); p. 214 (compared with *H. magnipinna*, new species); Proc. Biol. Soc. Washington, vol. 22, 1909, p. 7 (listed); Crinoids of the Indian Ocean, 1912, p. 114 (synonymy, range, and depth).

Himerometra persica A. H. CLARK, Smiths. Misc. Coll. (Quart. Issue), vol. 52, 1908, p. 214 (Albatross Station 5163, Philippine Islands, south of San Gasanga, Tataan group, 28 fathoms; also Philippine Islands, without more definite data); Proc. Biol. Soc. Washington, vol. 22, 1909, p. 7 (part) (listed); Crinoids of the Indian Ocean, 1912, p. 116 (part) (records from the Philippine Islands).

Heterometra martensi A. H. CLARK, Vidensk. Medd. fra den naturhist. Forening i København, 1909, p. 164 (Singapore); Crinoids of the Indian Ocean, 1912, p. 127 (Singapore).

Range.—Known only from Singapore and from the Philippine Islands, where it has been dredged at the following localities; off Balinpongpong Island, south of Jolo, west of Tapul Island, south of

Jolo, and south of San Gasanga (Sanga Sanga) (Tataan group) south of Jolo; there is also a record from the Philippine Islands, with no additional data.

Depth.—Littoral, and down to 28 fathoms.

6. *HIMEROMETRA PERSICA* A. H. Clark.

Himerometra persica A. H. CLARK, Smiths. Misc. Coll. (Quart. Issue), vol. 50, 1907, p. 356 (listed; nomen nudum); Bull. Mus. Comp. Zool., vol. 51, 1908, No. 8, p. 243 (Persian Gulf); Proc. Biol. Soc. Washington, vol. 22, 1909, p. 7 (listed); American Naturalist, vol. 43, 1909, p. 256 (occurs in the Persian Gulf, but the genus is not represented in the Red Sea); Crinoids of the Indian Ocean, 1912, p. 116 (synonymy, habitat, and depth; excepting the records from the Philippine Islands which refer to *H. bartschi*).

Range.—Only known from the Persian Gulf.

Depth.—Littoral.

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